

California Regional Water Quality Control Board  
Santa Ana Region

Amended Cleanup and Abatement Order No. R8-2005-0053

For

Goodrich Corporation,  
Pyro Spectaculars, Inc., and  
Kwikset Locks, Inc., Emhart Industries, Inc., Kwikset Corporation, and Black &  
Decker Inc.

160-Acre Property Located in the City of Rialto,  
San Bernardino County

The California Regional Water Quality Control Board, Santa Ana Region  
(hereinafter Regional Board), finds that:

1. The Goodrich Corporation, Pyro Spectaculars, Inc., Kwikset Locks, Inc., Emhart Industries, Inc., Kwikset Corporation, and Black & Decker Inc., (hereinafter Dischargers) have caused or permitted, are causing or permitting, or threaten to cause or permit waste, i.e., perchlorate and/or trichloroethylene (TCE), to be discharged or deposited where it is, or probably will be, discharged into waters of the state from a 160-acre property (hereinafter Property) bounded approximately by Casa Grande Park Avenue on the north, Locust Avenue on the east, the extension of Alder Avenue on the west, and the extension of Summit Avenue on the south, in the City of Rialto, San Bernardino County, and have created, or threaten to create, a condition of pollution or nuisance.
2. Section 13304(a) of the California Water Code provides that :

"Any person...who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into waters of the state and creates, or threatens to create, a condition of pollution or nuisance, shall upon order of the regional board clean up the waste or abate the effects of the waste, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including but not limited to, overseeing cleanup and abatement efforts. A cleanup and abatement order issued by the state board or a regional board may require the provision of, or payment for, uninterrupted replacement water service, which may include wellhead treatment, to each affected water supplier or private well owner. Upon failure of any person to comply with the cleanup and abatement order, the Attorney General, at the request of the board, shall petition the superior court for that county for the issuance of an injunction requiring the person

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to comply with the order. In the suit, the court shall have jurisdiction to grant a prohibitory or mandatory injunction, either preliminary or permanent, as the facts may warrant."

3. Section 13350(l) of the California Water Code defines "pollution" as the alteration of the water quality to a degree that unreasonably affects either beneficial uses or facilities that serve these beneficial uses.
4. Pursuant to Chapter 3 of the Water Quality Control Plan for the Santa Ana Region, groundwater underlying and immediately downgradient of the Property is within the Rialto Groundwater Management Zone. Based on hydrogeologic studies that have been performed in the Rialto Groundwater Management Zone and surrounding groundwater management zones by the Regional Board, United States Geologic Survey and others, groundwater in the Rialto Groundwater Management Zone is tributary to the Riverside – B Groundwater Management Zone, and the southeastern-most portion of the Chino North Groundwater Management Zone. The beneficial uses of these groundwater management zones include municipal and domestic supply, agricultural supply, industrial service supply and industrial process supply.
5. State Water Resources Control Board Resolution No. 92-49 describes policies and procedures that apply to all investigations, and cleanup and abatement activities, for all types of discharges subject to Section 13304 of the California Water Code. The Resolution requires dischargers to "clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best water quality which is reasonable if background levels of water quality cannot be restored, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible."
6. TCE, a chlorinated solvent, is extremely persistent in the environment. TCE is partially soluble; when spilled or released to bare ground, it moves through underground soils, and can be mobilized by groundwater. TCE has commonly been found as a contaminant in the soil and groundwater at industrial sites, long after its use was discontinued. According to the Agency for Toxic Substances and Disease Registry (ATSDR), the National Toxicology Program has determined that TCE is "reasonably anticipated to be a human carcinogen" and the International Agency for Research on Cancer has determined that TCE is "probably carcinogenic to humans." The California Department of Health Services (DHS) has established a drinking water maximum contaminant level (MCL) for TCE of 5 micrograms/liter (µg/l).
7. Perchlorate salts, including ammonium perchlorate, potassium perchlorate and others, are highly soluble and dissociate in water to form perchlorate

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ions. According to medical studies, perchlorate can interfere with the function of the human thyroid. The California Office of Environmental Health Hazard Assessment (OEHHA) has established a public health goal of 6 µg/l for perchlorate. Based on this public health goal, the DHS has proposed a drinking water MCL for perchlorate of 6 µg/l. The current DHS notification level for perchlorate in drinking water is 6 µg/l.

8. The discharge of perchlorate and TCE, as described in this Order, creates, or threatens to create, a condition of pollution or nuisance, because it has interfered with, or threatens to interfere with, the use of water supplies for municipal and domestic beneficial uses.
9. In or about 1951, Kwikset Locks, Inc. (KLI), a manufacturer of household door locks, established a defense products division to obtain government contracts for the production of munitions. In February 1952, KLI formed the West Coast Loading Corporation (WCLC) to load and assemble munitions as a subcontractor to fulfill contracts obtained by KLI from the United States Government and the Department of Defense.
10. During 1952, WCLC (as a subsidiary of KLI) constructed a manufacturing plant on the Property. Prior to 1952, the Property was vacant land.
11. During the period from 1952 to 1957, WCLC used the Property for the manufacture of explosive cartridges, photoflash cartridges, flares, ground burst simulators, and other incendiary devices. WCLC manufactured many of these products under subcontract to KLI for use by the military, under KLI's contracts with the U.S. Government. WCLC also processed chemicals at the Property for use by other government contractors in the manufacture of solid rocket propellant. WCLC also processed chemicals for the manufacture of flares and other products containing perchlorate for non-defense purposes.
12. From 1952 (or earlier) to 1957, various chemicals were delivered, stored, and used for WCLC's manufacturing activities at the Property. The chemicals that were used, stored, and processed at WCLC during its occupancy of the Property included ammonium perchlorate, potassium perchlorate, potassium chlorate, aluminum, iron oxide, and various compounds of nitrate, lead, and barium, as well as TCE and other organic solvents.
13. WCLC's records indicate that very large amounts of perchlorate salts were handled at the facility. For example, a purchase order dated September 2, 1955, and delivery confirmations show that 47,000 pounds of potassium perchlorate were purchased from Western Electrochemical Co., Henderson, Nevada, and delivered to the Property for use by WCLC.

14. As a further example, invoices and purchase orders, dated March 8, 1957, indicate that Grand Central Rocket Company received 43,250 pounds of ammonium perchlorate from WCLC after WCLC processed (i.e., dried) the ammonium perchlorate to a moisture content of 0.03% or less. The purchase orders state that Grand Central Rocket Company had supplied the material to WCLC. These business records for the work done under contract with Grand Central Rocket Company demonstrate that the handling, drying, and storage of very large amounts of perchlorate salts occurred at the WCLC facility. The stringent requirements for low moisture are specific to the requirements for use of ammonium perchlorate as an oxidizer in the manufacture of solid propellant. Grand Central Rocket Company was in the business of manufacturing solid rocket propellant for use in military weapons systems during 1957, concurrent with the date of the purchase orders and the WCLC invoices for the 43,250 pounds of ammonium perchlorate.
15. WCLC's records included "standard operating procedures" (SOPs) for processing potassium perchlorate for use in WCLC products. WCLC's SOPs for the drying of potassium perchlorate state that potassium perchlorate powder was moved from barrels to uncovered trays, and then screened to remove lumps. The open trays were then moved to an oven in a different building using a hand-truck. Sacks were then filled with potassium perchlorate and stored indoors after drying was complete.
16. WCLC documents and deposition testimony from former WCLC employees establish a multi-step process for the manufacture of photoflash cartridges, including drying, screening, and a second round of drying, weighing, mixing, and loading. Each of these steps involved the handling, processing and/or movement of potassium perchlorate in order to mix photoflash powder. The drying, screening, weighing, mixing, and loading all took place in different rooms. WCLC documents further reveal that approximately 4%, by weight, of the perchlorate used to make photoflash cartridges was expected to be lost during the manufacturing process. WCLC documents show that WCLC used more than 50,000 pounds of perchlorate for the manufacture of photoflash cartridges during the period from 1952 to 1957. Therefore, WCLC expected that 2,000 pounds of perchlorate would have been lost during the manufacturing process just for these cartridges at the site.
17. Some spillage would have occurred during the handling, drying, screening, weighing, mixing, loading, transporting, and storage of ammonium perchlorate and potassium perchlorate at WCLC. Also, given the very fine nature of the dried, screened perchlorate powder, it is reasonable to conclude that the process of transporting perchlorate from room to room and the physical movement of the perchlorate powder during the drying, screening, weighing, mixing, and loading processes would result in the mobilization of perchlorate

powder into the air, and subsequent deposition onto floors, walls, ceilings, and other surfaces.

18. This conclusion is supported by numerous pages throughout the SOPs and the "standard non-operating procedures" for chemical handling at the WCLC facility, which include requirements for sweeping up spilled powder, wiping spillage with wet rags, and wet-mopping of spills and powder deposited on various surfaces during processing. These written procedures include specific instructions for cleaning up spills of chemicals from tabletops, floors and sink areas, and disposing of soiled rags, towels, filters and cups into "slop crocks" that were stored in the WCLC work rooms and magazines ("igloos" or "bunkers"). The site janitor's job included sweeping the buildings, burning of scrap and explosive materials, and disposal of trash and metal cans at WCLC's on-site dump.
19. It is reasonable to conclude that the extensive written procedures were developed because spillage and surface accumulation of chemical products, including perchlorate salts, was expected to occur, and routinely did occur, during processing of those products at the WCLC facility. Testimony and WCLC documents reveal that the spillage and/or accumulation of perchlorate salts on equipment, walls, floors, and ceilings led to at least one significant explosion. Testimony of former employees of WCLC provided during depositions conducted beginning in 2004, and continuing to the present, verifies that, in the buildings that were used by WCLC for weighing, screening, drying, mixing and loading perchlorate salts, the equipment, floors, walls, and ceilings were washed with rags and water-wet mops to remove chemical dust at least 4 times per shift, as specified in the SOPs.
20. Deposition testimony of former WCLC employees also indicates that the mops used for cleaning the chemical residue were rinsed with water in buckets, and the contents of the buckets were dumped onto the bare ground outside of the buildings. Based on the use of perchlorate salts in these buildings, the water that was routinely dumped on the ground would have contained perchlorate. Further testimony from WCLC employees indicates that the metal trays that were used by WCLC employees for the screening and drying of perchlorate were taken outdoors to be cleaned. The residual perchlorate salts that remained on the trays were rinsed from the trays onto the bare ground, using a faucet and water hose.
21. Former WCLC employees have testified that during the period from 1952 to 1957, WCLC stored and disposed of chemical-soiled rags, cans, and other wastes at the site, as directed by WCLC's written procedures. This testimony is also supported by WCLC's records, as well as staff's collective knowledge and experience in the oversight of investigation and cleanup activities at numerous industrial sites throughout the Santa Ana Region where chemicals,

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including perchlorate salts and volatile organic compounds (VOCs) such as TCE, were used during the 1950s and 1960s. Standard industrial practices at such facilities in the 1950s and 1960s typically resulted in some spillage and on-site disposal of chemical products. Deposition testimony from former WCLC employees indicates that WCLC operated an on-site laundry, used for the washing of the soiled rags. Since the Property was not sewered, any disposal of chemicals to sinks, drains, and floor drains would have entered on-site septic systems and gone to groundwater. The laundry drain apparently discharged directly onto the bare ground.

22. According to WCLC's "Safety Regulations for Handling Azides, Styphnates, and Similar Explosives," (dated January 3, 1954 and approved by WCLC's Executive Vice-President and General Manager, Gerald D. Linke), the used sponges and cleaning rags, cleaning water and other waste liquids generated from operations, including mixing photoflash powder containing perchlorate, were to be "taken to the disposal pit south of the plant site and drained into the ground."
23. In addition to the explosives and incendiary devices that were manufactured and the large amounts of perchlorate salts that were stored and handled at the site, WCLC owned "igloos" on adjacent land located southwest of the 160-acre property. WCLC leased space in the igloos to other parties, and also reserved space in the igloos for shared use by WCLC, expressly for the storage of explosives. Many explosives are known to contain perchlorate salts, so it is reasonable to conclude that perchlorate salts were stored in the igloos by WCLC.
24. Deposition testimony of former WCLC employees indicates that drums of organic solvents, including TCE, were stored at various locations at WCLC during its period of operation. When the solvent was needed, a drum of the liquid was placed horizontally onto a metal or wooden "cradle", and the liquid was then dispensed through a spigot. Former WCLC employees have testified that, when solvent was being dispensed from the drums, it was common for some amount of solvent to drip or flow from the spigot into a metal can on the floor below the spigot. When the can became full, employees would take the can and "toss it out the back door" onto the bare ground.
25. Former WCLC employees have also testified that rags soaked in TCE were used to clean by hand at least one of the chemical mixers at WCLC. The rags were dipped into a bucket of TCE, and excess solvent was squeezed out of the rags periodically throughout the workday. According to deposition testimony, employees took the solvent-soaked rags outside of the mixer building to wring excess TCE from the rags onto the bare ground. Eyewitness testimony from at least one former WCLC employee describes

the disposal of empty solvent drums. The drums were disposed of on-site at WCLC by crushing them with heavy equipment, digging large holes in the ground and then burying the drums. It is reasonable to conclude that some residue of the solvent would have been in the drums, and that this residual solvent may have leaked onto the ground, and discharged or threatened to discharge into the groundwater below.

26. The following findings describe the corporate history of WCLC, and explain the legal liability of KLI, Emhart Industries, Inc. (EII), Kwikset Corporation and Black & Decker Inc. (BDI) for WCLC's discharges to waters of the state. Various legal theories apply to each named party supporting the conclusion that each is responsible for WCLC's discharges. These theories include express merger, de facto merger, express assumption of liability, and continuation of the name and product line. An Order against any or all of these entities is timely.
- a. In February 1952, KLI formed WCLC as a subsidiary to conduct work at the Rialto location. On February 28, 1957, the Board of Directors of the American Hardware Corporation ("AHC"), a Connecticut corporation, approved a tender offer whereby AHC would acquire KLI through an exchange of AHC stock for KLI stock. As part of its negotiations, AHC anticipated liquidating KLI, acquiring all of KLI's assets and liabilities, and operating KLI's business as a division of AHC. Prior to the acquisition, AHC executives toured the WCLC facility in Rialto and WCLC's documents were available for inspection. On May 1, 1957, AHC sent a letter to KLI shareholders inviting them to exchange their KLI stock for AHC stock. AHC declared the exchange offer successful on July 1, 1957 with nearly 100% of the stock exchanged. On that same day, AHC sent a letter to new AHC stockholders informing them that KLI would be operated temporarily as a corporate subsidiary, but would eventually be dissolved and operated as a manufacturing and sales division of AHC.
  - b. On or about July 3, 1957, contemporaneous with the exchange offer described above, WCLC merged into KLI. According to a July 1, 1957 KLI Board of Directors resolution, quoted in KLI's Certificate of Ownership filed with the State of California, KLI assumed "all the liabilities and obligations" of WCLC, and "shall be liable therefore in the same manner as if it had itself incurred such liabilities and obligations." Pursuant to the merger of KLI and WCLC, KLI also took title to the 160 acres from WCLC on July 1, 1957.
  - c. The acquisition of KLI and its subsidiaries, including WCLC, by AHC was in fact and in law, a merger. While numerous documents regarding these transactions have been produced, a June 1957 agreement between AHC and KLI entitled the "Form and Assumption Agreement" and the KLI "Plan

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of Dissolution" (both referred to in corporate minutes) have not been produced by the named parties. While these documents would likely shed additional light on the precise nature of the acquisition of KLI by AHC, other contemporaneous documents, the testimony of surviving former KLI directors, and the conduct of corporate successors to AHC in honoring KLI liabilities make clear that the transfer from KLI to AHC was a merger. The facts also establish that AHC expressly assumed by contract all of KLI's and WCLC's liabilities, known and unknown, contingent and non-contingent, for discharges at the 160-acre parcel.

- d. On July 19, 1957, KLI sold the 160-acre Rialto property to the B.F. Goodrich Company. KLI ceased its manufacturing activities in Rialto, but continued operating as a "division" of AHC, doing business in Anaheim, California, producing Kwikset's well-known product line of household door locks.
- e. On or about April 11, 1958, AHC's Board of Directors declared that KLI should be dissolved, and KLI's Board of Directors adopted a plan of dissolution whereby all KLI assets would be transferred to AHC. AHC, the sole shareholder of KLI, commenced the dissolution of KLI on or about May 28, 1958.
- f. The nature of the AHC purchase of KLI is discussed in the "Minutes of Regular Meeting of the Board of Directors, The American Hardware Corporation," dated June 5, 1958. During that meeting, the Directors took action related to the purchase of KLI. One action was to approve modification of a loan to secure the purchase of KLI. Another action taken by the Directors related to the dissolution of KLI. The minutes state, in part:

"WHEREAS, the Board of Directors of KWIKSET LOCKS, INC. ADOPTED A Plan of Dissolution to be effected by the distribution and transfer of all of the assets and business to this corporation as the owner and holder of all of the issued and outstanding shares of capital stock upon the condition that this corporation expressly assume and guarantee in good faith to pay all debts, liabilities and obligations of KWIKSET LOCKS, INC. in existence on the date of such distribution and transfer of its assets and business, contingent or otherwise known or unknown...

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"NOW, THEREFORE, BE IT RESOLVED, that the President or any Vice President, and the Secretary or Assistant Secretary of this corporation, be and they are hereby

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authorized and directed in the name of and on behalf of this corporation (a) to execute and deliver to KWIKSET LOCKS, INC., an appropriate form of assumption agreement expressly assuming all obligations and liabilities of KWIKSET LOCKS, INC., as aforesaid..."

The AHC Directors minutes make clear that AHC expressly intended to assume responsibility for the obligations – known and unknown – of KLI. This transaction results in AHC's liability for KLI's, and, by extension, WCLC's liabilities. That liability was then transferred forward to the other named entities by the series of corporate transactions that are described below.

- g. In or about June 1958, KLI's Board of Directors executed and filed a "Certificate and Winding Up and Dissolution of Kwikset Locks, Inc., a California Corporation." This Certificate declares that KLI's Board of Directors declared that all of the liabilities of KLI had been provided for by AHC's assumption of "all debts and liabilities of said corporation remaining unpaid as of June 30, 1958."
- h. On June 30, 1958, KLI was dissolved and a liquidating distribution of KLI's assets was made to its sole shareholder, AHC. AHC thereafter continued producing the Kwikset product line at the former KLI Anaheim facility. In the 1958 AHC Annual Report, Evan J. Parker, then-President of AHC, stated, "In order to simplify the corporate structure, Kwikset Locks, Inc. (a wholly-owned subsidiary) was dissolved as of June 30, 1958, and all of its assets and liabilities transferred to the parent company. The manufacturing operations formerly conducted by Kwikset were continued as the Kwikset division."
- i. Multiple documents from 1958 or shortly thereafter, submitted under penalty of perjury to the Securities and Exchange Commission ("SEC") and the Internal Revenue Service ("IRS"), confirm that all of KLI's assets and liabilities were transferred to AHC. For example, IRS Form 7004, "Application for Automatic Extension of Time," was submitted to the IRS on behalf of KLI by C. K. Nelson, Assistant Treasurer, on September 15, 1958. This document contains KLI's stated reason for the requested extension: "**The corporation was merged with another corporation** as of June 30, 1958." (emphasis added).
- j. Another contemporaneous tax form, IRS Form 843, "Claim," dated November 28, 1961, was submitted on behalf of "KLI, Transferor" and "American Hardware Corporation, Transferor." In Schedule A, the following statement is contained in the second paragraph:

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"Kwikset Locks, Incorporated was substantially a **wholly-owned subsidiary of American Hardware Corporation** as of January 1, 1958. On June 30, 1958, Kwikset Locks, Inc. was dissolved. **All the assets and liabilities were transferred to the parent corporation**, and operations were continued as Kwikset Division of the American Hardware Corporation." (emphasis added).

These documents indicate that AHC realized certain tax benefits from KLI, took advantage of tax losses of KLI for the years 1952-1957, and accounted for depreciation of KLI equipment on AHC tax returns.

- k. The conduct of AHC after the dissolution of KLI is further evidence that AHC assumed all of KLI's liabilities. AHC honored KLI's lockset return policy for the replacement of broken or defective locksets, regardless of when the locksets were purchased. Because it was unknown how many locksets purchased prior to June 30, 1958 would be returned after that date, the potential liability was an unknown future liability.
- l. AHC also continued the Kwikset Employee Pension Trust after the dissolution of KLI. Because it was unknown what future contributions would be required to maintain the Pension Trust, it is an unknown, contingent liability assumed by AHC. EII continued the Kwikset Employee Pension Plan, and credited qualified retirees their employment history, even prior to 1958.
- m. AHC merged with Emhart Manufacturing Company, a Delaware Corporation, on June 29, 1964. The surviving corporation in the merger was AHC, under a new corporate name, "Emhart Corporation," as of June 30, 1964.
- n. Emhart Corporation changed its name to Emhart Industries, Inc., on May 4, 1976.
- o. A company called Kwikset Corporation was incorporated in California in 1985 as a wholly-owned subsidiary of EII, and was capitalized using the net assets of the Kwikset Division of EII. Kwikset Corporation of California later merged with a company called Kwikset Corporation (a Delaware Corporation). The latter is the surviving corporation and is the subject of this Order. Kwikset Corporation (a Delaware Corporation) thus retains the name, product line, and assets of the former KLI and Kwikset Division (of AHC and later of EII). Moreover, Kwikset Corporation is the entity that has custody and possession of historical documents of WCLC, KLI, and AHC.

p. EII was acquired by Black & Decker Inc., a subsidiary of the Black & Decker Corporation, in 1989. EII is in the process of winding up its business and affairs, having filed a Certificate of Dissolution in the State of Connecticut in 2002. Documents related to the acquisition of EII by BDI, and of EII's 2002 dissolution, were produced in this matter. As part of EII's dissolution, BDI became EII's sole shareholder. EII made liquidating distributions to BDI in an estimated amount of \$716 million in 2002. As the sole shareholder receiving liquidating distributions upon EII's dissolution, BDI is statutorily responsible for orders brought and enforced against EII.

q. AHC's purchase of KLI was more than a mere stock purchase and assumption of known liabilities, as EII has claimed. It constitutes a complete merger. A merger, unlike a purchase, results in the assumption of the liabilities and assets of the merged corporation by the surviving corporation. The documents contemporaneously prepared at or around the time of the 1957 AHC acquisition, demonstrate that KLI and AHC understood and believed the 1957 purchase of KLI to be a "merger," with the result that AHC assumed all of KLI's liabilities both known and unknown. In addition, a Kwikset Corporation publication, entitled "Kwikset A Black & Decker Company Employee Handbook," contains the following quotation:

"In 1957, Kwikset Locks, Inc. merged with the American Hardware Corporation of New Britain, Connecticut and subsequently became known as the Kwikset Division."

Moreover, the Black & Decker website, as it appeared in 2002, indicated under "Company History" that KLI was merged into AHC. Notably, during the investigation of this matter in 2002, and shortly after this fact was pointed out to Kwikset's and EII's representatives, the website was changed to remove this statement.

r. BDI, by virtue of its status as parent corporation of EII and having received the stock of EII upon dissolution, is a legal successor to EII's and WCLC's liabilities under this order. At the time of EII's dissolution, BDI held itself out as a guarantor of the liabilities of EII. On that basis, BDI, is, by extension, a successor of WCLC.

27. In 1957, the B.F. Goodrich Company (now the Goodrich Corporation, hereinafter Goodrich) purchased the Property from Kwikset Locks, Inc. When Goodrich purchased the Property, the Property consisted of a number of buildings and other structures that were constructed by WCLC.

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28. Goodrich operated a propellant research and rocket production facility at the Property. Records indicate that Goodrich transferred some staff from its solid propellant research and development operations in Brecksville, Ohio to this facility. Goodrich also hired additional staff from other geographic areas, including California, to fill positions needed for propellant research and rocket production at the facility.
29. During its occupancy of the Property, from 1957 to 1964, Goodrich manufactured rockets for the United States military. Goodrich's contracts for rocket motor production at this facility included at least five sounding rockets for the U.S. Navy: LOKI I and LOKI IIA (Mark 32 Mod O rocket motor); the Sidewinder 1C (Mark 31 Mod O rocket motor); ASP 1; and ASP 4. Some propellant research projects and small scale production of other rocket motors were also carried out at the site, under contract with the U.S. Government, including research on the Atmos rocket (Mod 24) and the test motor for the jet assisted take off (JATO-TM-6) rocket. Other small-scale testing operations at the site included the TM-2 and the TM-5 test motors.
30. As part of the development, testing and production of solid rocket propellant and rocket motors, Goodrich used various chemicals at the Property, including TCE and ammonium perchlorate.
31. Ammonium perchlorate is a salt that is used as an oxidizer in solid propellant. Ammonium perchlorate was the oxidizer used for rocket motors manufactured by Goodrich at the Property, with only a few minor exceptions. TCE is an organic solvent, commonly used as a degreaser, and for cleaning and removing residue from stainless steel fixtures, motors and parts.
32. Records indicate that ammonium perchlorate was received by Goodrich in bulk form at the Property, and was dried and ground at the Property, before it was mixed with a polymer fuel-binder in a separate building at the Property.
33. Available evidence, including Goodrich documents and the testimony of former Goodrich employees who worked at this facility between 1957 and 1964, establishes the following facts:
  - a. Three buildings with mixers, as well as a larger, separately housed 150 gallon mixer, were used at the Property for preparing batches of propellant, which contained ammonium perchlorate. For each batch of propellant, the oxidizer was blended with the polymer fuel binder (for example, Hycar butadiene polymer was used in the Sidewinder propellant and polyurethane was used in the propellant for the Atmos Model 24). The entire propellant mixture, which contained oxidizer, was then removed from the mixer and poured into the rocket motor casings. The rocket

motors were then cured for specific time periods. A percentage of the completed rocket motors were tested by Goodrich on-site, in a static test bay.

- b. The mixing bowls and apparatus for each mixer were thoroughly cleaned before preparing and mixing the next batch of propellant. It was common practice for this process to occur several times a day. The cleaning process included a washout of the mixing bowls, as well as all the mixer apparatus and any reusable metal parts, using TCE to remove any residue. The washout waste was disposed of in Goodrich's on-site burn pits. Small quantities of the washout waste were also disposed of directly to the bare ground outside of the mixer buildings. This washout waste included ammonium perchlorate and TCE.
- c. Sixty to 90 pounds of solid propellant were used in each JATO test rocket. The ammonium perchlorate, which was the oxidizer, made up approximately 70% by weight of this propellant, thus totaling 42 to 63 pounds of ammonium perchlorate for each JATO test motor. The number of JATO rockets that were produced at the Property is not known. Approximately 12 JATO motors were tested at the site by Goodrich, with at least 2 failing tests occurring in the test bay. Failure of any rocket motor required cleanup of the residual (unburned) scrap propellant and disposal of the waste into Goodrich's on-site burn pit. This waste would have included ammonium perchlorate.
- d. Each LOKI IIA rocket motor contained 20 to 50 pounds of propellant. The ammonium perchlorate made up approximately 70% by weight of this propellant, thus 14 to 35 pounds of ammonium perchlorate for each rocket motor. A technical paper dated December 5, 1961, presented by Goodrich Rialto staff at a technical conference, indicates that Goodrich began the development and manufacturing of the LOKI IIA motor in 1958. Approximately 1,000 LOKI IIA rockets were produced at the Rialto facility between early 1959 and December 1961. Therefore, between 14,000 to 35,000 pounds of ammonium perchlorate were used in these LOKI IIA rockets at the site. Sixty-three of the LOKI IIA motors were static tested at the Rialto site between 1958 and 1961. Two rocket motor malfunctions were recorded, one of which resulted in rupture of the rocket motor casing in the on-site test bay. An additional 12 LOKI IIA test motors were fired from a previous Goodrich Rialto production batch, with a single test motor failure in the test bay. Unburned scrap propellant was disposed of in Goodrich's on-site burn pit.
- e. One hundred to 200 pounds of propellant were used in each of the ASP 4 rockets produced by Goodrich at the Property. Ammonium perchlorate made up approximately 70% by weight of this propellant, thus 70 to 140 pounds of ammonium perchlorate were used in each ASP 4 rocket motor.

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- f. The ASP 1 rocket was a precursor of the ASP 4 rocket, and was larger than the ASP 4 rocket. At least one former Goodrich Rialto employee stated that each ASP 1 rocket contained "several hundred pounds of propellant" which is consistent with the ASP 1 being larger than the ASP 4. Propellant used in the ASP 1 was 70% by weight ammonium perchlorate. The quantity of ASP 1 and ASP 4 rockets produced and tested at the Property is not known, but at least one extremely large (2,000 pounds total weight) ASP rocket was tested in the static test bay at the Goodrich facility.
- g. The Atmos rocket contained approximately 50 pounds of propellant, with 70% by weight ammonium perchlorate. Thus, there were 35 pounds of ammonium perchlorate in each Atmos rocket. At least two Atmos motors, containing a minimum total of 70 pounds of ammonium perchlorate, were made and tested at the Property. Each TM-2 and TM-5 test motor contained approximately 15 to 20 pounds of propellant, thus 10.5 to 14 pounds of ammonium perchlorate were used in each TM-2 and TM-5 test motor. Total production quantity estimates at the Property are not available for the Atmos and the test motors.
- h. The propellant for the Sidewinder missile also contained ammonium perchlorate as the oxidizer. Based upon the dimensions available in photographs and diagrams of the Sidewinder missile, the calculated mass of propellant was 64 pounds per missile.

Therefore, at approximately 70% by weight, there were approximately 45 pounds of ammonium perchlorate in each Sidewinder missile. At least 500 Sidewinder missiles were contracted for production at the site, thus requiring at least 22,500 pounds of ammonium perchlorate in these missiles.

- i. Goodrich's procedure for loading rocket motors involved overfilling each rocket motor with propellant. This procedure allowed for the necessary volume of propellant to remain in the motor casing after shrinkage, which generally occurred during the curing process. The excess propellant was trimmed from every rocket. In deposition testimony, a former Goodrich employee estimated that 5% of the total propellant for each Sidewinder missile was discarded as scrap as a result of the overfilling process. Based on the 22,500 pounds of ammonium perchlorate in the 500 Sidewinder missiles, there were at least 1,125 pounds of ammonium perchlorate that were disposed of as scrap at the Property during the production of the 500 Sidewinder missiles. Because all rocket motors were overfilled, not just Sidewinders, it is reasonable to conclude that 5% of the propellant for the other rockets manufactured by Goodrich at the Property was similarly trimmed as scrap. Accordingly, applying this 5% estimate to the total propellant for the LOKI IIA, an estimated 700 to 1,750 pounds of

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ammonium perchlorate would have been discarded at the site during production of the 1,000 LOKI IIA rockets. Scrap propellant trimmed from Goodrich's various rocket motors was stored for various periods of time in five-gallon neoprene buckets in at least two open areas outside Goodrich's assembly buildings.

- j. All of Goodrich's production waste was disposed of in Goodrich's burn pits located on the Property. For example, it was common practice to dispose of scrap materials (also known as "pipe") that were trimmed from the solid propellant, consisting of ammonium perchlorate, polymer binder, aluminum and other chemicals, into two or more unlined earthen pits located on the Property. Other chemical waste, in the form of a slurry of propellant mixed with solvent (specifically TCE and methyl ethyl ketone (MEK)), was placed into the pits to be burned. Some of the waste was in 40-gallon drums. Burns usually occurred at least once a week and sometimes three to four times per week. The ammonium perchlorate and TCE dumped into the pit was sometimes left for two or more days before it was ignited and burned. Water was routed to at least one of the pits by way of a pipe buried in the ground, with a nozzle in the pit. The water was routinely utilized to extinguish burning material. Residual smoldering materials were left in the pits to burn out. Ash and residue were left in the open pits, exposed to precipitation. Because the pits were earthen and open to the elements, rain that fell into these pits would necessarily mix with the chemical residue and infiltrate into the gravelly soils and to the groundwater table.
- k. Approximately 100 Sidewinder missiles were rejected after production at the Property, owing to defects (cracks) that developed in the solid propellant after it was cured inside of the motor casing. At 64 pounds of propellant per Sidewinder missile, the total scrap propellant from this operation was approximately 6,400 pounds, with 70 percent by weight ammonium perchlorate. Thus, there were at least 4,500 pounds of ammonium perchlorate as waste from the rejected motors. Goodrich employees salvaged the 100 motor casings by removing the solid propellant, using high pressure jets of water and then TCE. This salvage operation was conducted under an open sided breezeway with a metal awning. The waste propellant from this operation was disposed of into one of the on-site burn pits.
- l. After removal of the waste propellant from the rejected Sidewinder missiles, numerous particles of the waste were observed to be scattered and embedded into the walkways between Goodrich's production buildings. The material was later removed from the walkways, in order to prevent an explosive hazard, and taken to the burn pits for disposal.

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- m. An estimated 10 rockets or missiles were tested daily at the Goodrich static test bay, with an estimated malfunction of one rocket or missile per week. Misfired or malfunctioning devices were typically salvaged so that the motor casing could be re-used. Defective rockets that self-extinguished would contain propellant that was later removed. Residue from the burn tests was routinely swept up from the test bay, and taken to one of the burn pits along with the leftover propellant. On some occasions, the residue and unburned propellant were rinsed from the concrete test bay with a water hose, onto the bare ground.
34. After Goodrich vacated the Property in 1964, the Property was divided into numerous separate parcels at different times, with multiple landowners. Since 1964, several tenants involved in pyrotechnics (fireworks) have occupied portions of the site. Most of the tenants that operated pyrotechnic facilities on the Property no longer exist or are no longer viable companies, and there are no known successors that have any responsibility for many of those former operations.
35. In 1979, Pyro Spectaculars, Inc., (hereinafter Pyro Spectaculars) was formed as a California Corporation. Pyro Spectaculars established operations in 1979 on three contiguous parcels, consisting of approximately 47 acres within the Property. The 47 acres on which Pyro Spectaculars operated was in the northwest half of the southwest quarter of Section 21, Township 1 North, Range 5 West, San Bernardino Baseline and Meridian in the County of San Bernardino, State of California (the site). The current lessor and property owner of the site is Mr. Wong Chun Ming of Hong Kong, China.
36. Since 1979, Pyro Spectaculars' operations at the site have included importing pre-manufactured components for various fireworks, assembling fireworks displays, assembling fireworks assortment packages, storing and testing fireworks, and the storage and disposal of waste. Pyro Spectaculars continues many of these same activities at the site today.
37. Historical records of Pyro Spectaculars' product inventory indicate that many different fireworks product were stored, tested and disposed of at the Property by Pyro Spectaculars. Potassium perchlorate is known to be used as an oxidizer in fireworks. Further evidence (see Finding 40, below) clearly indicates that fireworks products and waste materials from Pyro Spectaculars' operations contained potassium perchlorate.
38. Records also indicate that there were several major fires and explosions at the site, as well as numerous minor fire incidents, during the time that Pyro Spectaculars was operating at the site. Water was used for fire suppression during many of these incidents. The water would have extinguished the flames and prevented further combustion of the flammable materials, while



also mobilizing the remaining perchlorate salts in the flammable materials, thus moving the salts into the soil and toward the groundwater table.

39. Prior to 1971, it was the practice among the various pyrotechnic companies that conducted business at, and adjacent to, the Property to utilize several earthen pits for the disposal of unusable, defective and excess fireworks, chemicals and other waste (hereinafter collectively referred to as pyrotechnic waste). The pyrotechnic waste was taken to the earthen pits, which were located south-southwest of what would become Pyro Spectaculars' 47-acre site, and burned.
40. Although the practice of "open burning" of pyrotechnic waste in North Rialto was restricted after 1971, Rialto Fire Department records indicate that, due to the hazards involved with long-term storage of pyrotechnic waste at the various facilities that operated on and adjacent to the Property, some burning of pyrotechnic waste in North Rialto was permitted to continue. Records indicate that Pyro Spectaculars burned its pyrotechnic waste in a burn pit in 1987. Permits were also issued to Pyro Spectaculars in 1988 for burning of 400 to 700 pounds of pyrotechnic waste at their Locust Avenue address in Rialto. According to the permits, burning was approved for various two to four week intervals throughout the year. A permit was also issued to Pyro Spectaculars in 1999 for burning 500 pounds of pyrotechnic waste over a one-month period.
41. Records from the Rialto Fire Department indicate that numerous brushfires and small explosions in and adjacent to the burn pits and fireworks testing areas occurred throughout the history of Pyro Spectaculars' operations at the site, sometimes requiring the use of water for fire-suppression, and thus mobilizing perchlorate salts in the remaining, unburned and ash materials. There were fires and explosions both on-site and off-site, some of which occurred as a result of Pyro Spectaculars' activities.
42. Based upon staff's review of numerous aerial photographs showing the site and adjacent properties, it appears that the earthen burn pits located south-southwest of Pyro Spectaculars' 47-acre leased site were not backfilled until approximately 1987. The pits appear to have been used for disposal, and possibly for burning of waste, as late as 1986. It is reasonable to assume that, like the other pyrotechnic companies that operated on the Property, Pyro Spectaculars likely used these earthen burn pits beginning when Pyro Spectaculars began operating at the Property in 1979 until 1986 when the pits were backfilled. The waste placed in the burn pits by Pyro Spectaculars would have contained perchlorate.
43. In 1971, as an alternative to the open burning of waste, the Apollo Manufacturing Company (a division of Pyrotronics Corporation) built a

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concrete-lined, rectangular shaped disposal pit, approximately 20 feet wide, 25 feet long and 4 feet deep, located on property south of what would become Pyro Spectaculars' 47-acre site. The concrete-lined pit, which later came to be known as the McLaughlin Pit, was used from 1971 to 1987 by Apollo and other local fireworks companies, including Pyro Spectaculars, as a disposal pit for pyrotechnic waste. The waste would have contained perchlorate.

44. Records from the period of 1979 to 1986 indicate that Pyro Spectaculars typically placed some of its pyrotechnic waste, including "dud" fireworks that contained perchlorate salts, into the McLaughlin Pit. Water was added to the waste, which was kept submerged to eliminate the potential for explosion or ignition; this pyrotechnic waste remained submerged in the McLaughlin Pit for extended periods of time. Correspondence dated January 17, 1984 from Pyro Spectaculars' Plant Manager describes the pyrotechnic component of the various aerial shells that Pyro Spectaculars disposed of as hazardous waste into the McLaughlin Pit. The January 17, 1984 letter clearly states that Pyro Spectaculars' waste contained potassium perchlorate. Perchlorate salts are highly soluble and dissociate in water to form perchlorate ions. Therefore, the standing water in the McLaughlin Pit would have contained perchlorate.
45. There are records of two separate occasions when pyrotechnic waste remained in the McLaughlin Pit for about three months at a time. There is also information indicating that, in one instance, 3.9 tons of accumulated pyrotechnic waste was dredged from the McLaughlin Pit. In 1985, 2,000 pounds of "waste from the manufacture of explosives" was taken from the pit. Some of this waste was from Pyro Spectaculars. These wastes would have included perchlorate salts.
46. The McLaughlin Pit overflowed on several occasions during rainy weather, and the wastewater flowed over the concrete sidewalls onto the adjacent bare ground. It is reasonable to assume that this wastewater percolated into the highly permeable gravelly soil adjacent to the McLaughlin Pit, allowing perchlorate to infiltrate in the soil and migrate to groundwater.
47. In September 1987, waste remaining in the McLaughlin Pit was burned; the pit was then backfilled with soil, compacted, and permanently closed. Soon thereafter, the area where the McLaughlin Pit was located was graded, and an extensive concrete slab was poured for use as a foundation for structures and concrete pipe storage by the new owner of that property.
48. Pyro Spectaculars' hazardous waste disposal reports show that, in a two-day period in April 1988, 135 pounds of pyrotechnic waste were logged for disposal as hazardous waste. During the same week in early April 1988, Pyro Spectaculars' obtained a two-week permit from the Rialto Fire

Department to burn an estimated 700 pounds of pyrotechnic waste on-site; thus, some or all of the material that was logged as hazardous waste in April 1988 may have been burned at the site. Over a 17-day period in November-December 1988, 756 pounds of pyrotechnic hazardous waste were logged by Pyro Spectaculars for disposal. There are no records of burn permits for Pyro Spectaculars for this 17-day period. It is reasonable to assume that this and similar volumes of waste would previously have been burned in the earthen pits or on open ground, or placed periodically into the McLaughlin Pit.

49. In addition, Rialto Fire Department records indicate that, as recently as 1996, Pyro Spectaculars continued the practice of burning some of its pyrotechnic waste at their 47-acre site. As mentioned in Finding 40, above, Pyro Spectaculars also obtained a permit to burn pyrotechnic waste at the Property in 1999. Since there was no longer a lined pit in North Rialto, it is reasonable to assume that the burning took place either in an existing earthen burn pit, or on open ground at or near the Property.
50. Environmental assessment activities at and in the vicinity of the Property began in 2003, and have included soil investigations (borings and trench excavations), soil gas investigations, and installation and sampling of groundwater monitoring wells. These field activities have been carried out by Goodrich, EII, Pyro Spectaculars and other occupants of the Property, continuing through late 2006.
  - a. In January 2003, the Regional Board entered into an Interim Agreement with Goodrich. The agreement stated that the Board would not initiate any enforcement action against Goodrich during the two-year period specified in a separate agreement between the water purveyors and Goodrich (which expired on December 31, 2004), provided that Goodrich supplied funding to local water purveyors for wellhead treatment.
  - b. In 2003, the U.S. EPA issued an Administrative Order to Goodrich and EII, requiring investigation of the Property. EII did not initially comply with the U.S. EPA Order; Goodrich initially responded to the EPA's Order by performing a soil and soil gas investigation at various areas of the Property.
  - c. In 2004, in response to the Administrative Order, EII conducted a limited shallow soil and soil gas investigation at the Property.
  - d. In 2004, in response to the Administrative Order, Goodrich installed four monitoring wells (PW-1, 2, 3 and 4); three immediately upgradient and downgradient of the Property along the Property boundaries, and one within the Property.

- e. In 2004, Pyro Spectaculars conducted a limited shallow soil investigation of selected areas of the Property.
  - f. In 2005, the Regional Board adopted a Remedial Investigation Order by Consent for Goodrich. In accordance with the Remedial Investigation Order by Consent, Goodrich conducted an off-site groundwater investigation. The groundwater investigation consisted of the installation and sampling of five deep groundwater monitoring wells, located along the expected path of the perchlorate and TCE plume, downgradient of the Property.
  - g. In 2006, EII, in partial response to a cleanup and abatement order issued by the Executive Officer, and Pyro Spectaculars, in response to a Section 13267 investigation order issued by the Executive Officer, conducted an on-site soil and groundwater investigation at the Property. The soil investigation included shallow soil borings, trench excavations and limited deep soil borings. The groundwater investigation included installation and sampling of five groundwater monitoring wells within the Property.
51. Results from analysis of soil samples that were obtained during trench excavations and drilling of wells and boreholes indicate that perchlorate is present in the soil at several areas within the northern portion (former manufacturing area) of the Property, as well as in several areas linked to the former disposal and burning pits in the southern portion of the Property.
- a. Soil investigations in the northern portion of the Property found that perchlorate was present in the shallow soil (less than 25 feet below ground surface (bgs) at various locations:
    - i) Perchlorate was present at concentrations up to 7,400 micrograms/kilogram ( $\mu\text{g}/\text{kg}$ ) at two buildings (#1 and #10) formerly used by WCLC/EII and Goodrich.
    - ii) Perchlorate was present at concentrations up to 57  $\mu\text{g}/\text{kg}$  at the locations of other buildings that were formerly used by WCLC/EII and Goodrich.
    - iii) Perchlorate was present at a maximum concentration of 58  $\mu\text{g}/\text{kg}$  at the locations of former perchlorate screening/drying areas, which were locations formerly used by WCLC/EII and Goodrich.
    - iv) Perchlorate was present at a maximum concentration of 60  $\mu\text{g}/\text{kg}$  at the location of a former 150-gallon mixer, a location formerly used by Goodrich and various pyrotechnics companies.

- b. Soil investigations in the southern portion of the Property found that perchlorate was present in the shallow soil (less than 25 feet below ground surface) at the locations of four former earthen burn/disposal pits:
  - i) Perchlorate was present at a maximum concentration of 760  $\mu\text{g/kg}$  at the location of one former pit (located in an area known as Area C) that is now beneath a building.
  - ii) Perchlorate was present at a maximum concentration of 6,800  $\mu\text{g/kg}$  at the location of a former pit (Area D1) formerly used by Goodrich, at a maximum concentration of 3,900  $\mu\text{g/kg}$  at the location of a former pit (Area D2) used by various fireworks companies, and at a maximum concentration of 310  $\mu\text{g/kg}$  at the location of a former pit (Area D3) used by various fireworks companies.
- c. A soil investigation at the McLaughlin Pit found that perchlorate was present in both the shallow and deep soil:
  - i) Perchlorate was present at a maximum concentration of 205,000  $\mu\text{g/kg}$  in shallow soil samples (less than 20 feet bgs) collected from trenches excavated along the McLaughlin Pit boundaries and a boring that was advanced through the bottom of the McLaughlin Pit.
  - ii) A follow-up soil boring was advanced through the bottom of the McLaughlin Pit. Soil samples were collected every 20 feet for the entire depth of the borehole until groundwater was encountered at a depth of approximately 435 feet bgs. Perchlorate was present in every soil sample, extending from the surface all the way through the vadose zone to the groundwater. Perchlorate was present at a maximum concentration of 190,000  $\mu\text{g/kg}$  in the shallower soil samples (20 to 180 feet bgs) to a maximum concentration of 1,500  $\mu\text{g/kg}$  in the deeper soil samples (200 to 435 feet bgs). TCE was not detected, with the exception of one sample at 300 feet bgs (8.7  $\mu\text{g/kg}$ ).
- d. Soil samples collected at 20 foot intervals from two of the five well bores drilled by Ell/Pyro Spectaculars that were closest to the McLaughlin Pit, found that perchlorate was present throughout the soil column:
  - i) At borehole CMW-01 (about 60 feet southeast of the McLaughlin Pit), perchlorate was found to increase with depth from a concentration of 31  $\mu\text{g/kg}$  at 65 feet bgs to a concentration of 2,300  $\mu\text{g/kg}$  at 135 feet bgs. The deepest soil sample collected from this borehole was at a depth of approximately 375 feet bgs, and had a perchlorate concentration of 110  $\mu\text{g/kg}$ .

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- ii) At borehole CMW-02, (about 300 feet southwest of the McLaughlin Pit and adjacent to a former earthen disposal/burn pit used by Goodrich), perchlorate was detected in soil samples collected from approximately 10 feet to 258 feet bgs, with a maximum concentration of 1,700 µg/kg found at 180 feet bgs.

52. Nine groundwater monitoring wells have been installed at the Property to characterize water quality and flow direction. Groundwater samples collected from these wells confirm that perchlorate and TCE are present in groundwater underlying the Property.

a. Four monitoring wells (PW-1 through PW-4) were installed by Goodrich:

- i) PW-1, located upgradient, along the northern boundary of the Property, does not contain perchlorate or TCE (perchlorate was detected in PW-1 in October 2005 and January 2006 at 6.3 and 1.6 µg/l, but was not detected prior to and subsequent to these detections).
- ii) Perchlorate concentrations in PW-2, located within the southern portion of the Property, have ranged from approximately 40 to 10,000 µg/l. TCE in PW-2 has ranged from 40 to 390 µg/l.
- iii) Perchlorate concentrations in PW-3, located near the southeast, downgradient corner of the Property, have ranged from 28 to 80 µg/l. TCE in PW-3 has ranged from 7.4 to 52 µg/l.
- iv) Perchlorate concentrations in PW-4, located along the eastern boundary of the Property, have ranged from 1.1 to 5.5 µg/l. TCE in PW-4 has ranged from 1.4 to 3.8 µg/l.

b. Five monitoring wells (CMW-01 through CMW-05) were installed by Pyro Spectaculars and EII. Three of the wells (CMW-01 through CMW-03) were installed in the vicinity of the McLaughlin Pit. Two of the wells (CMW-04 and CMW-05) were installed upgradient of the McLaughlin Pit, between the northern (former manufacturing) and southern (former disposal) areas of the Property.

- i) Perchlorate and TCE have been detected in CMW-01, located immediately downgradient of both the McLaughlin Pit and a former earthen disposal/burn pit, at concentrations as high as 770 µg/l and 87 µg/l, respectively.
- ii) Perchlorate and TCE have been detected in CMW-02, located cross-gradient from the McLaughlin Pit and near a former earthen

disposal/burn pit, at concentrations as high as 80 µg/l and 356 µg/l, respectively.

- iii) TCE was detected in CMW-03, located approximately 330 feet upgradient (northwest) of the McLaughlin Pit, along a fence that divides the northern and southern areas of the Property, at a concentration of 5.3 µg/l.
- iv) Perchlorate and TCE have been detected in CMW-04, located immediately downgradient of Buildings #1 and #10, where Goodrich's reclamation of approximately 100 Sidewinder rocket motor casings took place, at concentrations as high as 54 µg/l and 47 µg/l, respectively.
- v) Perchlorate and TCE have been detected in CMW-05, located immediately downgradient of the former 150-gallon solid propellant mixer room, which was used by Goodrich and various fireworks companies, at concentrations as high as 260 µg/l and 100 µg/l, respectively.

53. Groundwater samples obtained from the five deep, off-site, downgradient, multi-port (Westbay™) monitoring wells (PW-5 through PW-9) installed by Goodrich, confirm that perchlorate and TCE are migrating from the Property. The wells were installed from as close as 0.9 miles to up to 3.2 miles from the Property. Each well has five to seven sampling ports at various depths. The sampling ports range in depth from 355 to 820 feet bgs.

- a. PW-8 is located approximately 4,500 feet (0.9 miles) downgradient of the Property, at West Valley Water District's Well No. 22 property. Concentrations of perchlorate have ranged from 46 to 140 µg/l, and concentrations of TCE have ranged from 9.8 to 22 µg/l, with the highest concentrations found at a depth of approximately 445 feet bgs.
- b. PW-5 is located approximately 9,500 feet (1.8 miles) downgradient of the Property. Concentrations of perchlorate have ranged from non-detect to 1,200 µg/l, with the highest concentration found at a depth 560 feet bgs. TCE concentrations have ranged from non-detect to 25 µg/l, with the maximum concentration found at 515 feet bgs.
- c. PW-6 is located approximately 1,000 feet southwest of PW-5. The highest concentration of perchlorate found in PW-6 was 1.9 µg/l at a depth of 445 feet bgs. TCE was not detected in PW-6.

- d. PW-7 is located approximately 11,500 feet (2.2 miles) downgradient of the Property. The maximum concentrations of perchlorate and TCE found in PW-7 were 7.7 µg/l and 0.56 µg/l, respectively, at a depth of 500 feet.
  - e. PW-9 is located approximately 17,000 feet (3.2 miles) downgradient of the Property, at the City of Rialto Well No. 6 property. Perchlorate and TCE are present in the groundwater to a depth of 815 feet bgs. Perchlorate concentrations have ranged from non-detect to 190 µg/l, and TCE concentrations have ranged from non-detect to 5.1 µg/l, with the highest concentrations found at a depth of approximately 485 feet bgs.
54. The Dischargers have caused or permitted, or are causing or permitting, or threaten to cause or permit waste, i.e., perchlorate or TCE, to be discharged or deposited where it is, or probably will be, discharged into waters of the state, and have created, or threaten to create, a condition of pollution or nuisance. Therefore, it is appropriate to order the Dischargers to clean up the waste and abate the effects of the waste.
55. Sixteen municipal water supply wells downgradient of the Property, in the Rialto, Riverside - B, and Chino North Groundwater Management Zones, contain perchlorate above a detection limit of about 1.0 µg/l. These wells belong to the West Valley Water District (WVWD), the Cities of Rialto and Colton, and the Arrowhead Medical Center. These wells are Rialto No. 1, Rialto No. 2, Rialto No. 4, Rialto No. 6, Chino No. 1 (City of Rialto), Chino No. 2 (City of Rialto), WVWD No. 11, WVWD No. 16, WVWD No. 17, WVWD No. 18, WVWD No. 22, WVWD No. 42, Colton No. 15, Colton No. 17, Colton No. 24 and the Arrowhead Medical Center Well. Six of these wells (WVWD No. 22, Rialto No.1, Rialto No. 2, Rialto No. 6, Chino No. 1 and Chino No. 2) also contain TCE, above a detection limit of 0.5 µg/l. The West Valley Water District, Arrowhead Medical Center and the Cities of Rialto and Colton have limited or ceased the use of these municipal water supply wells as a result of the presence of perchlorate and TCE in the wells.
56. These sixteen wells are located from as close as 0.9 miles to about 6.0 miles from the Property. The concentrations of perchlorate and TCE in these wells generally decrease in relation to the well's distance from the Property. Sampling during the past twelve months, or the most recent sampling in the event a well was not sampled during the last twelve months, has shown that five of these sixteen wells have exceeded the public health goal of 6 µg/l on at least one occasion. These wells are Rialto No. 2, Rialto No. 4, Rialto No. 6, Chino No. 1, and WVWD No. 22. The remaining eleven wells contain perchlorate, but have not exceeded the public health goal of 6 µg/l during the past twelve months. Only one of the sixteen wells, WVWD No.22, has exceeded the MCL for TCE during the past twelve months. Five of the



sixteen wells contain TCE, but have not exceeded the MCL for TCE during the past twelve months.

57. Seven of the sixteen wells (Chino No. 1, Chino No. 2, Colton No. 15, Colton No. 17, Colton No. 24, WVWD No. 42, and WVWD No. 18) were previously put back into operation after having perchlorate treatment systems installed. Most of the capital costs for construction of these systems were provided by Goodrich (\$3 million, as a result of an interim settlement agreement with the Regional Board and the water purveyors), the State Water Resources Control Board's Cleanup and Abatement Account (\$2.25 million), Proposition 50 (about \$3 million), and Regional Board liability assessments (\$135,000). The remainder of the costs, and ongoing operational costs, are being borne by the water purveyors.
58. Eight of the sixteen wells (Rialto No. 1, Rialto No. 2, Rialto No. 4, Rialto No. 6, Arrowhead Medical Center Well, WVWD No. 11, WVWD No. 17 and WVWD No. 22) are not currently operating. The Arrowhead Medical Center well was shut down and the Arrowhead Medical Center was connected to a local municipal water supply system. WVWD No. 22 was abandoned, and WVWD No. 17 is currently inactive. Rialto No. 1, Rialto No. 2, Rialto No. 4, Rialto No. 6 and WVWD No. 11 are not pumping as a result of the presence of perchlorate and/or TCE in the wells.
59. One of the sixteen wells that contain perchlorate, WVWD No. 16, is currently operating (the average perchlorate concentration in this well is about 2.0 µg/l). Therefore, of the sixteen wells downgradient of the Property that contain perchlorate, seven have perchlorate treatment systems installed, eight are not operating and one is operating without perchlorate treatment.
60. One municipal water supply well, WVWD Well No. 33, located downgradient of the Property near Rialto Well No. 4, does not contain perchlorate.
61. The presence of both perchlorate and TCE in PW-9, at a concentration of 190 µg/l and 5.1 µg/l, respectively, clearly indicates that the perchlorate and TCE discharging from the Property have advanced farther than 3.2 miles from the Property. The presence of both perchlorate and TCE in Chino No. 2, located about 4.5 miles from the Property, indicates that the perchlorate and TCE discharging from the Property have advanced farther than about 4.5 miles. Although TCE is not present in the Colton No. 15, Colton No. 17, Colton No. 24, WVWD No. 42, and WVWD No. 18 wells, located up to about 6.0 miles from the Property, these wells do contain perchlorate. Based on the differing characteristics of perchlorate and TCE, perchlorate travels faster and disperses farther laterally and vertically in groundwater than TCE. Therefore, it would be expected that the migration of TCE discharged from the Property would lag behind that of perchlorate discharged from the Property. This is

consistent with perchlorate being detected and TCE not being detected in the Colton No. 15, Colton No. 17, Colton No. 24, WVWD No. 42, and WVWD No. 18 wells.

62. The geology, hydrogeology and aquifer characteristics of the Rialto, Riverside-B, and Chino North Groundwater Management Zones have been extensively researched and documented by various parties. Based on the geology, hydrogeology and aquifer characteristics of these groundwater management zones, and the above Findings, the presence of perchlorate and TCE in the sixteen municipal wells cited in Finding 55 is consistent with being a result of waste discharges by the Dischargers during the time that the Dischargers were at the Property.
63. Based on the above Findings, the Dischargers have caused or permitted, are causing or permitting, or threaten to cause or permit waste, i.e., perchlorate, to be discharged or deposited where it is, or probably will be, discharged into waters of the state, specifically the Rialto, Riverside - B, and Chino North Groundwater Management Zones, and has created, or threatens to create a condition of pollution or nuisance. Based on the above Findings, Goodrich and WCLC and its legal successors have caused or permitted, are causing or permitting, or threaten to cause or permit waste, i.e., TCE, to be discharged or deposited where it is, or probably will be, discharged into waters of the state, specifically the Rialto, Riverside - B, and Chino North Groundwater Management Zones, and has created, or threatens to create a condition of pollution or nuisance.
64. The Dischargers have discharged waste that has affected public water supplies. The sixteen municipal water supply wells described in Finding 55, and the municipal water supply well described in Finding 60, have been affected or are threatened to be affected by wastes discharged by the Dischargers.
65. OEHHA established its public health goal of 6 µg/l based upon the level of perchlorate in drinking water that would pose no significant health risk to individuals consuming the water on a daily basis over a lifetime. OEHHA is required to base its public health goal exclusively on public health considerations, without regard to cost impacts. Because OEHHA is the State agency responsible for such health risk assessments, it is appropriate to use the public health goal as the applicable level for determining wells requiring replacement drinking water supply.
66. Since the five municipal water supply wells described in Finding 56 contain perchlorate exceeding the public health goal of 6 µg/l, in accordance with Section 13304(a) of the California Water Code, it is appropriate to order the

provision of, or payment for, uninterrupted replacement water service, which may include wellhead treatment, to each affected water provider.

67. In addition to the sixteen municipal water supply wells described in Finding 55 that contain perchlorate, there are two WVWD wells that contain perchlorate, WVWD No. 41 and WVWD No. 37, that are located about 8 miles and about 10 miles downgradient from the Property, respectively. There is currently insufficient evidence to conclude that these wells have been affected by wastes discharged by the Dischargers.
68. The Fontana Water Company has seven municipal supply wells in the Chino North Groundwater Management Zone that contain perchlorate. The closest of these wells is located about 2 miles west, and cross-gradient (perpendicular) to the southeast flow direction of contaminants migrating from the Property. In addition, a fault separates the Chino North Groundwater Management Zone from the Rialto Groundwater Management Zone. This fault has been extensively documented as an effective groundwater barrier. Since the flow direction of contaminants migrating from the Property is not toward the Fontana Water Company wells, and the presence of the groundwater barrier is known to greatly inhibit the movement of groundwater from the Rialto Groundwater Management Zone to the Chino North Groundwater Management Zone in the area where the closest Fontana Water Company wells are located, there is currently insufficient evidence to conclude that these wells have been affected by wastes discharged by the Dischargers.
69. In the future, if additional evidence is obtained and the Regional Board determines that sufficient evidence is available to conclude that any of the wells described in Findings 67 and 68, or any other wells not cited above, have been affected by wastes discharged by the Dischargers, the Regional Board will consider an amendment to this order or a separate order in accordance with 13304 of the California Water Code.
70. Section 13267(b) of the California Water Code provides that:
- “In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region, shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable

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relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports."

As described in this Order, existing data and information show that the Dischargers have discharged, or are discharging, waste within this Regional Board's jurisdiction.

71. There is a need for additional groundwater investigation and continued groundwater monitoring, in order to delineate the lateral and vertical extent of the perchlorate and TCE and to complete a remedial investigation/feasibility study for the purpose of selecting an effective long-term remedial action plan. Therefore, in accordance with Section 13267 of the California Water Code, it is appropriate to order the Dischargers to furnish technical reports that delineate the extent of the perchlorate and TCE in the affected groundwater management zones that resulted from waste that has been discharged, or is being discharged, by the Dischargers.
72. California Water Code Section 13304 allows the Regional Board to recover reasonable expenses from responsible parties for overseeing cleanup and abatement activities. It is the Regional Board's intent to recover such costs for regulatory oversight work conducted in accordance with this order.
73. Section 13304(c)(1) of the California Water Code provides that:

"If the waste is cleaned up or the effects of the waste are abated, or, in the case of threatened pollution or nuisance, other necessary remedial action is taken by any governmental agency, the person or persons who discharged the waste, dischargers the waste, or threatened to cause or permit the discharge of waste within the meaning of subdivision (a), are liable to that governmental agency to the extent of the reasonable costs actually incurred in cleaning up the waste, abating the effects of the waste, supervising cleanup or abatement activities, or taking other remedial action. The amount of the costs is recoverable in a civil action by, and paid to, the governmental agency and the state board to the extent of the latter's contribution to the cleanup costs from the State Water Pollution Cleanup and Abatement Account or other available funds."

Therefore, the Dischargers are liable to the WVWD and the Cities of Rialto and Colton to the extent of the reasonable costs actually incurred in cleaning up the waste, abating the effects of the waste, supervising cleanup or abatement activities, or taking other remedial action. The Dischargers are also liable to the State Water Resources Control Board for cleanup costs from

the State Water Pollution Cleanup and Abatement Account that were provided to the WVWD and the Cities of Rialto and Colton.

74. This enforcement action is being taken by a regulatory agency to enforce a water quality law. Such action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.) in accordance with Section 15321, Article 19, Division 3, Title 14, California Code of Regulations.
75. Orders pursuant to Section 13267 and Section 13304 of the California Water Code have been issued to former tenants or former owners of the 160-acre parcel and adjacent properties. Additional orders may be issued, if Regional Board staff obtains additional information indicating that other specific tenants or owners have also discharged perchlorate or TCE that affects or threatens to affect groundwater.

IT IS HEREBY ORDERED THAT, pursuant to Section 13267 and Section 13304, Article 1, Chapter 5, Division 7, of the California Water Code, Goodrich Corporation, Pyro Spectaculars, Inc., Kwikset Locks, Inc., Emhart Industries, Inc., Kwikset Corporation and Black & Decker Inc., shall abate the effects of perchlorate, jointly and severally, and Goodrich Corporation, Kwikset Locks, Inc., Emhart Industries, Inc., Kwikset Corporation and Black & Decker Inc. shall abate the effects of TCE, jointly and severally, as follows:

1. By March \_\_, 2007, submit a proposed water replacement plan, including a time schedule for implementation, for the provision of, or payment for, uninterrupted replacement water service, which may include wellhead treatment, to the West Valley Water District and the City of Rialto. The water replacement plan shall address the five wells cited in Finding 56 that contain perchlorate that exceed the public health goal of 6 µg/l. The replacement water shall meet all applicable federal, state, and local drinking water standards, and shall have comparable quality to that pumped by the public water supply system prior to the discharge of waste. The water replacement plan shall be subject to the approval of the Executive Officer. Following approval by the Executive Officer, the Dischargers shall implement the water replacement plan.
2. By March \_\_, 2007, submit a water replacement contingency plan. The water replacement contingency plan shall address the eleven municipal water supply wells cited in Finding 56 that contain perchlorate in concentrations that do not currently exceed the public health goal of 6 µg/l, and WVWD No. 33, cited in Finding 60, that does not currently contain

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perchlorate. The water replacement contingency plan shall describe immediate plans to monitor data trends in these wells for the purpose of determining the likelihood of future exceedence of the public health goal for perchlorate or the MCL for TCE. The water replacement contingency plan shall describe actions to be taken to provide timely replacement water in the event that the public health goal for perchlorate or the MCL for TCE is exceeded at any time in the future. The water replacement contingency plan shall be subject to the approval of the Executive Officer. Following approval by the Executive Officer, the Dischargers shall implement the water replacement contingency plan.

3. The Dischargers may stop supplying uninterrupted replacement water service for a particular well upon the Executive Officer's concurrence that there have been four consecutive quarters of concentrations equal to or less than the public health goal of 6 µg/l for perchlorate and the MCL of 5 µg/l for TCE.
4. If OEHHA revises the public health goal for perchlorate, the new public health goal will take the place of the public health goal of 6 µg/l for the purpose of determining the wells subject to Items 1 through 3, above. If DHS establishes an MCL for perchlorate or revises the MCL for TCE, the new MCL will take the place of the public health goal for the purpose of determining the wells subject to Items 1 through 3, above.
5. By February \_\_, 2007, submit a conceptual work plan and time schedule for performing additional soil and groundwater investigations at the Property. The work plan shall propose work sufficient to define the lateral and vertical extent of the perchlorate and TCE at the Property that is discharging, has been discharged, or threatens to be discharged, by the Dischargers, for the purpose of developing an interim remedial action plan. The interim remedial action plan shall address actions needed to be taken to cleanup or abate soil and groundwater at or adjacent to the Property, so that the Property does not pose a threat to beneficial uses of groundwater downgradient of the Property. The work plan for performing additional soil and groundwater investigations at the Property, and any subsequent work plans necessary to sufficiently define the lateral and vertical extent of the perchlorate and TCE for the purpose of developing an interim remedial action plan, is subject to the approval of the Executive Officer, and shall be implemented in accordance with a time schedule approved by the Executive Officer.
6. Within 90 days after the Executive Officer determines that the lateral and vertical extent of perchlorate and TCE at the Property has been sufficiently defined, submit an interim remedial action plan, including an implementation schedule, to cleanup or abate soil and groundwater at or

adjacent to the Property, so the Property does not pose a threat to beneficial uses of groundwater downgradient of the Property. The interim remedial action plan and schedule shall be subject to the approval of the Executive Officer. The Dischargers shall implement the interim remedial action plan, as approved by the Executive Officer.

7. By March \_\_, 2007, submit a work plan and time schedule to fully define the lateral and vertical extent of the perchlorate and TCE downgradient of the Property that is discharging, has been discharged, or threatens to be discharged, by the Dischargers. The work plan, subject to the approval of the Executive Officer, shall be implemented in accordance with a time schedule approved by the Executive Officer.
8. Prepare and implement additional work plans that the Executive Officer deems necessary to sufficiently characterize the lateral and vertical extent of perchlorate and TCE downgradient of the Property that is discharging, has been discharged, or threatens to be discharged, by the Dischargers. The work plans shall be implemented in accordance with time schedules approved by the Executive Officer.
9. After the Executive Officer determines that the lateral and vertical extent of perchlorate and TCE downgradient of the Property that is discharging, has been discharged, or threatens to be discharged by the Dischargers has been sufficiently defined, submit a feasibility study that evaluates effective long term remedial alternatives, and includes a recommended long term remedial alternative. In accordance with State Water Resources Control Board Resolution No. 92-49, the recommended long term remedial alternative shall clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best water quality which is reasonable if background levels of water quality cannot be restored, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible. The feasibility study shall be submitted within 150 days of the Executive Officer's notification to the Dischargers that the definition of the extent of perchlorate and TCE is sufficiently complete. The feasibility study shall be subject to the approval of the Executive Officer.
10. Within 90 days of the Executive Officer's approval of the feasibility study, submit a remedial action plan, including an implementation schedule, to cleanup or abate the effects of the perchlorate and TCE that is discharging, has been discharged, or threatens to be discharged, by the Dischargers. The remedial action plan and schedule shall be subject to the approval of the Executive Officer. The Dischargers shall implement the remedial action plan as approved by the Executive Officer.

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11. The work conducted under this Order shall be performed in a manner consistent with the National Oil and Hazardous Substance Pollution Contingency Plan, Title 42, United States Code, Section 9605 and Code of Federal Regulations, Title 40, Part 300 ("NCP"). The Regional Board agrees to assist the Dischargers with activities that may be required to demonstrate consistency with the NCP.
12. All feasibility studies, interim remedial action plans and remedial action plans submitted in accordance with this Order shall be subject to a public meeting and a public comment period prior to being approved by the Executive Officer.
13. The Dischargers shall reimburse the West Valley Water District and the Cities of Rialto and Colton for past and ongoing reasonable costs incurred in cleaning up the waste, abating the effects of the waste, supervising cleanup or abatement activities, or taking other remedial action, in accordance with Section 13304(c)(1) of the California Water Code, as follows:

Within 30 days after notification by the Executive Officer that the West Valley Water District, the City of Rialto, the City of Colton or the State Water Resources Control Board have provided past costs incurred in cleaning up the waste, abating the effects of the waste, supervising cleanup or abatement activities, or taking other remedial actions, the Dischargers shall submit a Reimbursement Plan for Past Costs for that agency, for the approval of the Executive Officer. The Reimbursement Plan for Past Costs shall include a schedule for providing complete cost reimbursement for past costs for that agency within 90 days from the Executive Officer's approval of the Reimbursement Plan for Past Costs.

By February \_\_, 2007, the Dischargers shall submit a Reimbursement Plan for Ongoing Costs for the approval of the Executive Officer. The Reimbursement Plan for Ongoing Costs shall include a plan and schedule for providing ongoing cost reimbursement to the West Valley Water District and the Cities of Rialto and Colton for costs incurred in cleaning up the waste, abating the effects of the waste, supervising cleanup or abatement activities, or taking other remedial actions. The Reimbursement Plan for Ongoing Costs shall be implemented following the approval of the Executive Officer.

This Order, originally issued on February 28, 2005 and amended on December 2, 2005, is hereby amended.

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Failure to comply with the terms and conditions of this order may result in the imposition of civil liabilities, either administratively by the Regional Board or judicially by the Superior Court in accordance with Section 13350 of the California Water Code, and/or referral to the Attorney General for such action as may be deemed appropriate.

Ordered by:

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Walt Pettit  
Deputy Executive Officer

January \_\_, 2007

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